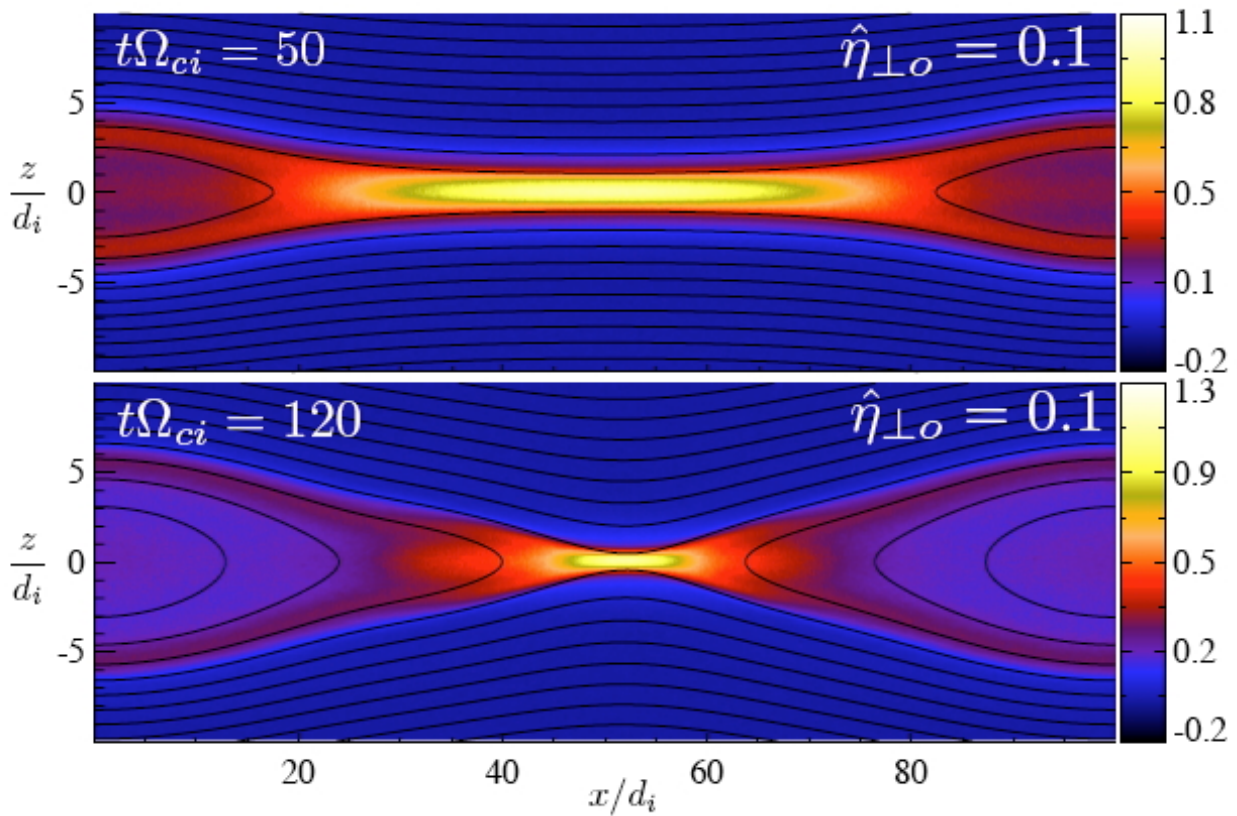


## Transition From Collisionless To Collisional Reconnection

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One of the key questions in magnetospheric physics is whether the physics of reconnection can be modeled adequately in global simulations. There has been considerable debate as to whether reduced two fluid models correctly capture aspects of reconnection that have global consequences such as time-dependence and reconnection rate. To address this issue the LANE HTP group is pursuing a new approach in which binary Coulomb collisions are included in a rigorous manner with kinetic simulations. This technique describes a full Fokker-Planck collision operator and thus permits a first-principles study of the transition between collisionless and collisional regimes. Using this approach on the newest supercomputers, it is now possible to seamlessly transition from the collisionless limit all the way to the resistive MHD regime.



*An intermediate transition example starting in a Sweet-Parker regime and then transitioning into a fast configuration due to Ohmic heating. Transition is marked by large structural changes in the current density.*